

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of:

Ozluturk et al.

Application No.: Not Yet Known

Our File: I-2-91.7US

Filed: Not Yet Known

Date: December 21, 2000

For: CODE DIVISION MULTIPLE ACCESS
(CDMA) COMMUNICATION SYSTEM

Group: Not Yet Known

Examiner: Not Yet Known

PRELIMINARY AMENDMENT

Box PATENT APPLICATION
Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to the initial Office Action, Applicants respectfully request that the application
be amended as follows:

IN THE TITLE

Please delete the title in its entirety and insert therefor --METHOD FOR USING
RAPID ACQUISITION SPREADING CODES FOR SPREAD-SPECTRUM
COMMUNICATIONS--.

IN THE CLAIMS

Please cancel claim 1 without prejudice.

Please add the following new claims:

--2. An improvement for a method for rapidly acquiring a spreading code, used in a code division multiple access (CDMA) system, the improvement comprising the steps of:

generating a first long code and a second long code, with each long code having a length N chips, with the first long code different from the second long code;

transmitting, over a communications channel using radio waves, the first long code and the second long code, at a first phase angle and at a second phase angle, respectively, on a carrier signal, with the first phase angle different from the second phase angle; and

acquiring, from the communications channel, using two phase-acquisition circuits in parallel, the first long code and the second long code from the first phase angle and the second phase angle, respectively, by searching, in parallel, N/2 chips of the first long code and the second long code.

3. The improvement as set forth in claim 2, with the step of transmitting including transmitting the first long code and the second long code, at an in-phase (I) angle and at a quadrature-phase (Q) angle, respectively, on the carrier signal, with the I angle ninety degrees out of phase with the Q angle.

4. The improvement as set forth in claim 3, with the step of acquiring including acquiring, from the communications channel, using an I-phase acquisition circuit and a Q-phase acquisition circuit in parallel, the first long code and the second long code from the

I angle and the Q angle respectively, of the carrier signal by searching, in parallel, N/2 chips
5 of the first long code and the second long code.

5. The improvement as set forth in claim 2, with the step of generating including
generating the first long code and the second long code from a multiplicity of short codes,
with each short code different from other short codes in the multiplicity of short codes, and
each short code in the multiplicity of short codes having a length less than N chips, with a
first short code thereby embedded in the first long code and a second short code embedded
in the second long code.

6. The improvement as set forth in claim 5, with the step of acquiring including
acquiring from the communications channel, using the two phase-acquisition circuits in
parallel, the first short code embedded in the first long code and the second short code
embedded in the second long code, from the first phase angle and the second phase angle,
5 respectively, by searching, in parallel, N/2 chips of the first short code and the second short
code.

7. An improvement for a method for rapidly acquiring a spreading code used in
a code division multiple access (CDMA) system, the improvement comprising the steps of:

generating a plurality of P long codes, where P is the number of long codes in the plurality of long codes, with each long code having a length N chips, and each long code being different from other long codes in the plurality of long codes;

transmitting, over a communications channel using radio waves, the plurality of long codes at a plurality of phase angles, respectively, on a carrier signal, with each phase angle in the plurality of phase angles being different from other phase angles; and

acquiring, from the communications channel, using phase-acquisition means, the plurality of long codes, respectively, by searching, in parallel, N/P chips of each long code of the plurality of long codes.

8. The improvement as set forth in claim 7, with the step of acquiring including acquiring, from the communications channel, using the phase-acquisition means, the plurality of long codes from the plurality of phase angles, respectively, of the carrier signal by searching, in parallel, N/P chips of each of the plurality of long codes.

9. The improvement as set forth in claim 7, with the step of transmitting including transmitting the plurality of long codes at the plurality of phase angles, respectively, on the carrier signal, with each phase angle in the plurality of phase angles representing an M -ary phase scheme.

10. The improvement as set forth in claim 9, with the step of acquiring including acquiring, from the communications channel, using the phase-acquisition means, the plurality of long codes, respectively, of the carrier signal by searching, in parallel, N/P chips of the first long code and the second long code.

11. The improvement as set forth in claim 7, with the step of generating including generating the plurality of long codes from a multiplicity of short codes, with each short code different from other short codes in the multiplicity of short codes, and each short code in the multiplicity of short codes having a length less than N chips, with a first short code thereby embedded in a first long code and a second short code embedded in a second long code.

12. The improvement as set forth in claim 11, with the step of acquiring including acquiring, from the communications channel, using the phase-acquisition means, the first short code embedded in the first long code and the second short code embedded in the second long code, from the first phase angle and the second phase angle, respectively, by searching, in parallel, N/P chips of the first short code and the second short code.

13. An improvement for a system for rapidly acquiring a spreading code, used in a code division multiple access (CDMA) system, the improvement comprising:

generator means for generating a first long code and a second long code, with each long code having a length N chips, and with the first long code being different from the second long code;

transmitter means for transmitting, over a communications channel using radio waves, the first long code and the second long code, at a first phase angle and at a second phase angle, respectively, on a carrier signal, with the first phase angle being different from the second phase angle; and

acquisition means for acquiring, from the communications channel, using two phase-acquisition circuits in parallel, the first long code and the second long code from the first phase angle and the second phase angle, respectively, by searching, in parallel, N/2 chips of the first long code and the second long code.

14. The improvement as set forth in claim 13, whereby said transmitter means transmits the first long code and the second long code, at an in-phase (I) angle and at a quadrature-phase (Q) angle, respectively, on the carrier signal, with the I angle ninety degrees out of phase with the Q angle.

15. The improvement as set forth in claim 14, with said acquisition means acquiring from the communications channel, using an I acquisition circuit and a Q acquisition circuit in parallel, the first long code and the second long code from the I angle

and the Q angle, respectively, of the carrier signal by searching, in parallel, N/2 chips of the
5 first long code and the second long code.

16. The improvement as set forth in claim 13, whereby said transmitter means
transmits the first long code and the second long code, at an in-phase (I) angle and at a
quadrature-phase (Q) angle, respectively, on the carrier signal, with the I angle ninety
degrees out of phase with the Q angle.

17. The improvement as set forth in claim 16, with said acquisition means
acquiring from the communications channel, using an I acquisition circuit and a Q
acquisition circuit in parallel, the first long code and the second long code from the I angle
and the Q angle, respectively, of the carrier signal by searching, in parallel, N/2 chips of the
5 first long code and the second long code.

18. The improvement as set forth in claim 13, with said generator means
generating the first long code and the second long code from a multiplicity of short codes,
with each short code different from other short code in the multiplicity of short codes, and
each short code in the multiplicity of short codes having a length less than N chips, with a
5 first short code thereby embedded in the first long code, and a second short code embedded
in the second long code.

19. The improvement as set forth in claim 18, with said acquisition means acquiring from the communications channel, using the two phase-acquisition circuits in parallel, the first short code embedded in the first long code and the second short code embedded in the second long code, from the first phase angle and the second phase angle, respectively, by searching, in parallel, $N/2$ chips of the first short code and the second short code.

20. An improvement for a method for rapidly acquiring a spreading code, used in a code division multiple access (CDMA) system, the improvement comprising the steps of:

generator means for generating a plurality of P long codes, where P is the number of long codes in the plurality of long codes, with each long code having a length N chips, and with each long code being different from other long codes in the plurality of long codes;

transmitter means for transmitting, over a communications channel using radio waves, the plurality of long codes at a plurality of phase angles, respectively, on a carrier signal, with each phase angle in the plurality of phase angles different from other phase angles in the plurality of phase angles; and

acquisition means for acquiring, from the communications channel, using phase-acquisition means, the plurality of long codes, respectively, by searching, in parallel, N/P chips of each long code of the plurality of long codes.

21. The improvement as set forth in claim 20, with said acquisition means acquiring from the communications channel, using the phase-acquisition means, the plurality of long codes from the plurality of phase angles, respectively, of the carrier signal by searching, in parallel, N/P chips of each of the plurality of long codes.

22. The improvement as set forth in claim 20, with said transmitter means transmitting the plurality of long codes at the plurality of phase angles, respectively, on the carrier signal, with each phase angle in the plurality of phase angles representing an M-ary phase scheme.

23. The improvement as set forth in claim 22, with said acquisition means further including means for acquiring from the communications channel, using the phase-acquisition means, the plurality of long codes, respectively, of the carrier signal by searching, in parallel, N/P chips of the first long code and the second long code.

24. The improvement as set forth in claim 20, with said generator means generating the plurality of long codes from a multiplicity of short codes, respectively, with each short code different from other short codes in the multiplicity of short codes, and each short code in the multiplicity of short codes having a length less than N chips, with a first short code thereby embedded in a first long code and a second short code embedded in a second long code.

25. The improvement as set forth in claim 24, with said acquisition means acquiring from the communications channel, using the phase-acquisition means, the first short code embedded in the first long code and the second short code embedded in the second long code, from the first phase angle and the second phase angle, respectively, by searching, in parallel, N/P chips of the first short code and the second short code.

26. An improvement for a system for rapidly acquiring a spreading code, used in a code division multiple access (CDMA) system, the improvement comprising:

a code generator for generating a first long code and a second long code, with each long code having a length N chips, with the first long code being different from the second long code;

a transmitter, coupled to said code generator, for transmitting, over a communications channel using radio waves, the first long code and the second long code, at a first phase angle and at a second phase angle, respectively, on a carrier signal, with the first phase angle different from the second phase angle; and

an acquisition circuit, coupled to the communications channel, for acquiring, from the communications channel, using two phase-acquisition circuits in parallel, the first long code and the second long code from the first phase angle and the second phase angle, respectively, by searching, in parallel, N/2 chips of the first long code and the second long code.

27. The improvement as set forth in claim 26, with said transmitter further including means for transmitting the first long code and the second long code, at an in-phase (I) angle and at a quadrature-phase (Q) angle, respectively, on the carrier signal, with the I angle ninety degrees out of phase with the Q angle.

28. The improvement as set forth in claim 27, with said acquisition circuit acquiring from the communications channel using an I acquisition circuit and a Q acquisition circuit in parallel, the first long code and the second long code from the I angle and the Q angle, respectively, of the carrier signal by searching, in parallel, $N/2$ chips of the first long code and the second long code.

29. The improvement as set forth in claim 26, with said code generator generating the first long code and the second long code, from a multiplicity of short codes, with each short code different from other short codes in the multiplicity of short codes, and each short code in the multiplicity of short codes having a length less than N chips, with a first short code thereby embedded in the first long code, and a second short code embedded in the second long code.

30. The improvement as set forth in claim 29, with said acquisition circuit acquiring from the communications channel using the phase-acquisition circuit, the first short code embedded in the first long code, and the second short code embedded in the

second long code, from the first phase angle and the second phase angle, respectively, by
5 searching, in parallel, $N/2$ chips of the first short code and the second short code.--

IN THE ABSTRACT

Delete the current abstract, and substitute the following abstract therefor:

--A method for rapidly acquiring a spreading code, used in a code division multiple access (CDMA) system comprises/generating a first long code and a second long code, with each long code having a length of N chips. The first long code is different from the second long code. The first long code and the second long code are transmitted at a first phase angle and at a second phase angle, respectively, on a carrier signal over a communications channel using radio waves. The first long code and the second long code may be transmitted at an in-phase (I) angle and at a quadrature-phase (Q) angle, respectively, on the carrier signal. From the communications channel, an I acquisition circuit and a Q acquisition circuit may acquire, in parallel, the first long code and the second long code from the I angle and the Q angle, respectively, of the carrier signal by searching, in parallel, $N/2$ chips of the first long code and the second long code.--

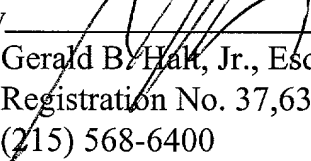
Applicant: Ozluturk et al.
Application No.: Not Yet Known

REMARKS

By this Preliminary Amendment, Applicants cancel claim 1 and add new claims 2-30; amend the title; and amend the abstract. Entry of this Amendment and prompt allowance of the pending claims is respectfully requested.

Respectfully submitted,

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